MassHighway
CRASH RATE WORKSHEET

STANDARD PROCEDURES

The Traffic Operations & Safety Unit of the Massachusetts Highway Department (MassHighway) has been working on developing a database of accident rates since the fall of 1997. The calculation of the accident (crash) rate for an intersection is an effective tool to measure safety hazards. The goal of this effort is to develop standard crash rates for both signalized and unsignalized intersections throughout the Commonwealth. Added functions will allow detailed analyses by District, City or Town, and for specific roadways.

Crash Rate Worksheet Standard Procedures :

1) The MassHighway Crash Rate Worksheet will be provided to all consultants for use in any, and all design report documents that will be reviewed by the Department. This includes, but is not limited to, Environmental Impact Reports, Functional Design Reports, Traffic & Safety Analyses and Mitigation Projects.

2) Please specify the City/Town and District that the subject intersection is located in. The date of the volume count data that is used in the project report should be listed as well. Use the most appropriate date should there be multiple years of data utilized. Finally, check off the type of traffic control that exists at the intersection.

3) Identify the major street at the subject intersection, along with each of the corresponding minor streets intersecting it. If there is more than one major street, label it as such.

4) Sketch out a diagram of the intersection, carefully labeling each approach. Identify north with an arrow in the box provided.

5) From the peak hour volume counts collected for the intersection, sum the totals by each approach and fill in the table provided. MassHighway prefers to use the PM Peak hour volumes, however the AM Peak is acceptable if it is the only data available. Please circle "AM" or "PM" to indicate the time period referenced. For a multi-leg intersection (4+ legs) it would be helpful to show the approach numbers on the *Intersection Diagram*.

6) Compute the "K" Factor for the intersection or dominant roadway, by reviewing the ATR counts collected. Use the same time period, preferably the PM Peak, that was used in determining the hourly approach volumes. A default value of 0.09 can be assumed for insufficient ATR data. Mark the "K" Factor in the box provided.

7) Calculate the intersection approach ADT by summing the directional approach volumes and dividing by the "K" Factor. The result is a measure of the daily entering vehicles for the subject intersection.

8) Review the accident (crash) data provided and determine the quantity of accidents occurring at the intersection over the time period presented. The accidents considered valid should occur at the intersection, or within the immediate vicinity. MassHighway requires a minimum of 3 years of accident data for traffic studies. Thus for the calculation of the accident rates, the average number accidents over the length of the study period is used.

9) Note that the year of the traffic volumes collected does not usually match the year of the crash data. The MassHighway accident database usually runs about 12 to 18 months behind the actual date due to processing time. We recognize that this creates inconsistencies, however it was deemed acceptable in order to keep an "active" database on *Crash Rates*. Use of more current City and Town accident data is acceptable, and encouraged.

10) The *Crash Rate* calculation is the last step in the process. The formula for calculating the accident rate for an intersection is presented below. The "Rate" (R) is expressed in **M**illion **E**ntering **V**ehicles (MEV), which is standard to the Traffic Engineering profession.

$$R = \frac{A \times 1{,}000{,}000}{V * T}$$

Where;

A = Average number of accidents at the study location, during a given time period (usually 1 year = 365 days)
V = Intersection ADT (all approach legs)
T = Time, expressed in the number of days in the study period (365)